Propositions containing some Properties of TANGENTS *to* Circles; *and of* TRAPEZIUMS *inscribed in Circles, and non-inscribed. Together with Propositions on the* Elliptic *Representations of* CIRCLES, *upon a plane Surface, by* PERSPECTIVE. *By* Richard Hey, *LL.D.; late Fellow of Sidney Sussex and Magdalen Colleges, in the University of Cambridge. Communicated by the Rev.* Edward Balme, *M.A. F.R.S.* Read March 31, 1814. [*Phil. Trans.* 1814, *p.* 348.]

That the perspective representation of an entire circle is an ellipse, is simply a part of the doctrine of conic sections, and is not in need of demonstration. The principal inquiry of the author has been with regard to the positions of the axes of such ellipses.

Selecting the case of any number of circles in the same plane, and having their centres in the same line, he examines what law is to be observed in the directions of the axes of the representing ellipses.

It is shown first, that, excepting one particular case, their axes do not converge to one point, but are parallel to other lines that do converge to one point. He does not, however, pretend to determine accurately and separately each of these other lines, but endeavours to ascertain certain limits within which they must be arranged, and a certain regularity in the variation of their directions, which he considers sufficient for all the practical purposes of the artist.

Preparatory to this inquiry are a series of propositions purely geometrical, relating to the properties of tangents to circles, and of trapeziums inscribed in circles, some of which may not be altogether new, but are inserted as necessary to the demonstration of other properties, which he believes have not before been noticed. These are kept separate from the perspective propositions, because they may be more interesting to mathematical readers than they might be if interwoven with considerations of their application to perspective representation. The greatest part of this paper of course could not admit of being publicly read, being unintelligible without reference to the figures which accompany it.

On new Properties of Light exhibited in the optical Phenomena of Mother-of-Pearl, and other Bodies to which the superficial structure of that Substance can be communicated. By David Brewster, *LL.D. F.R.S. Edin. and F.S.A. Ed. In a Letter addressed to the Right Hon. Sir* Joseph Banks, *Bart. K.B. P.R.S.* Read April 28, 1814. [*Phil. Trans.* 1814, *p.* 397.]

The first section of this paper is devoted to the optical properties peculiar to mother-of-pearl; the second to the communication of these properties to other bodies; the third to the consideration of the cause of these phenomena; and the fourth to the description of the peculiar species of polarization produced by this substance.

Dr. Brewster observes, mother-of-pearl is composed of laminæ, much resembling in their arrangement those of the agate; that when it is imperfectly polished, a coloured image of a candle is seen in it